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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,010	06/20/2003	STEVEN J. SEIPP	FIS920030142US1	1009

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EXAMINER	
STOCK JR, GORDON J	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,010	SEIPP, STEVEN J.	
	Examiner	Art Unit	
	Gordon J. Stock	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/21/06*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Amendment received on August 21, 2006 has been entered into the record.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. **Claims 1, 4-12, and 14-20** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In **claim 1** the step of determining substrate position and in **claim 12** the step of locating a third point of interest are abstractions without a tangible result. **Claims 4-11, 14-20** are rejected for depending upon a rejected base claim; wherein **claims 4-11, 14-20** further limiting of the parent claim still does not have a tangible result. Merely 'solving a system of equations' would not appear to be sufficient to constitute a tangible result, since the outcome of the 'solving' has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. See OG Notices: 22 November 2005, "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility".

Specifically: Part b. *Practical Application the Produces a Useful, Concrete, and Tangible Result* under Section IV *Determine Whether the Claimed Invention Complies with the Subject Matter Eligibility Requirement of 35 U.S.C. Sec. 101,* sentence 3, in the OG Notice from 22 November 2005 states 'In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible, and concrete."'

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-5, 10, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)—previously cited** in view of **Berman (6,347,291)—previously cited.**

As for **claim 1**, Gotoh in a method for manufacturing semiconductor devices discloses the following: disposing a patterned substrate in an exposure system with an alignment routine (col. 2, lines 10-15 and 20-25); locating a first point of interest on the patterned substrate (Fig. 5a: 8 and Fig. 5b: one array of marks in 5 different exposure fields); scanning a first area proximate the first point of interest for a first unique feature (col. 2, lines 24-25); defining a periodicity for the patterned substrate as defined by a constant pitch from a mask (col. 2, lines 20-22); locating a second point of interest based on the periodicity (Fig. 5a: 8, a second mark and Fig. 5b: a second array of marks in 5 different exposure fields); scanning a second area proximate the second point of interest for a second unique feature corresponding to the first unique feature (again, col. 2, lines 24-25 with Fig. 5a: 8, a second mark in first array of distortion marks and Fig. 5b: a second array of marks in 5 different exposure fields); gathering alignment data from at least scanning the first and second areas (col. 2, lines 24-26). As for 'determining substrate position relative to the exposure system from alignment data of at least the first and second scanned areas' Gotoh does not explicitly state this in the embodiments representative of Fig. 5a and Fig. 5b but he suggests it (col. 2, lines 25-30). And he teaches that there are alignment marks in each scanned area, at least four alignment marks to determine substrate

position(Fig. 2: 2; col. 1, lines 40-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to determine substrate position relative to the exposure system for at least two arrays of distortion marks with alignment marks in order to have proper alignment between substrate and mask in order to correctly evaluate the positions of the distortion marks relative to the exposure system by knowing the substrate position.

As for a stage, Gotoh is silent in the particular prior art embodiments, but he teaches a stage in Fig. 10 with a stage control unit (Fig. 10: 18). It would be obvious to one of ordinary skill in the art at the time the invention was made to have the system comprise a stage in order to provide support and relative positioning means for the wafer.

Gotoh is silent concerning 'the first unique feature is saved as an alignment image for use in locating the second unique feature in the second area.' However, Berman in a substrate position location system teaches using alignment images of structures in an intermediate area in order to determine the absolute position of a target structure in another area (col. 2, lines 20-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to save the first unique feature as an alignment image in order to determine the location of a neighboring feature in another area through shape comparison.

As for **claim 2**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses aligning the substrate relative to the exposure system (col. 2, lines 25-30 and col. 1, lines 45-53).

As for **claim 3**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses exposing the wafer with the exposure system (col. 2, lines 23-24).

As for **claim 4,** Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses that the substrate is a semiconductor wafer (Fig. 5b: 1).

As for **claim 5**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses the first and second unique features include alignment marks on the substrate (col. 2, line 12-15; Fig. 5a: 8; Fig. 5b: 8a).

As for **claim 10**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses a plurality of exposure fields (Fig. 5b: 8a); wherein the method comprises at least one of measuring at least one point of interest in each field of a plurality of exposure fields (col. 2, lines 18-30).

As for **claim 11**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses the substrate comprising a plurality of exposure fields, wherein each exposure field comprises at least one unique feature (Fig. 5b: 8a; wherein, each field comprising a plurality of distortion marks such as 8 from Fig. 5a).

6. **Claims 6, 9, 12-16, 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)—previously cited** in view of **Berman (6,347,291)—previously cited** further in view of **Utsunomiya (6,801,825)—previously cited.**

As for **claim 6**, Gotoh in view of Berman discloses everything as above (see **claim 1**). Gotoh is silent concerning mapping first and second points of interests and corresponding unique features to determine an orientation of substrate. However, Utsunomiya in a semiconductor exposure apparatus management system teaches mapping features (Figs. 2, 3a, 3b, 3c, Fig. 12a: 1113). Therefore, it would be obvious to one skilled in the art at the time the invention was

made to map the points of interests and marks of wafer to determine orientation error of the wafer in order correct for each measurement coordinate on the wafer.

As for **claim 9**, Gotoh in view of Berman discloses everything as above (see **claim 1**). Gotoh is silent concerning a path for automatic correction should the alignment routine fail to align, but suggests an automatic correction scheme (Fig. 8, 103-104). However, Utsunomiya in a semiconductor exposure apparatus management system teaches an automatic correction (Fig. 12b: feedback from 1119 to 1120 to B). Therefore, it would be obvious to one skilled in the art at the time the invention was made to provide automatic correction should alignment routine fail to align in order to provide iterative feedback to improve alignment accuracy.

As for **claim 12**, Gotoh in a method of manufacturing semiconductor devices discloses the following: defining a point of interest for each segment of the patterned substrate (Fig. 5a: 8; Fig. 5b: 8 wherein, at least one point of interest, an exposure field, in at least 5 segments comprising an exposure field consisting of an array of distortion marks); locating a first point of interest in a first segment as demonstrated through scanning the distortion marks; wherein, at least a first area proximate the first point of interest for a first unique feature, a distortion mark, is scanned (col. 2, lines 24-25); defining a periodicity for the patterned substrate as defined by a constant pitch from a mask (col. 2, lines 20-22); locating a second point of interest in a second segment based on the periodicity; wherein a second area proximate the second point of interest for a second unique feature, a second distortion mark of a second array of marks, corresponding to the first unique feature (col. 2, lines 24-25; Fig. 5b: 8a); measuring the second point of interest (col. 2, lines 25-30); locating a third point of interest in a third segment based on the periodicity (Fig. 5b: 8a—third exposure field of five exposure fields). As for saving a scanned image of the

first area and mapping the alignment of the substrate with respect to the tooling in which it was disposed, Gotoh is silent. However, Utsunomiya in a semiconductor exposure apparatus management system teaches mapping features (Figs. 2, 3a, 3b, 3c, Fig. 12a: 1113) and demonstrates saving an image of area of measurement for reference (Fig 7; col. 5, lines 40-50). Therefore, it would be obvious to one skilled in the art at the time the invention was made to map the points of interests and marks of wafer to determine orientation error of the wafer in order correct for each measurement coordinate on the wafer. And it would be obvious to one skilled in the art at the time the invention was made to save a scanned image of the first area of measurement in order to determine distortion by measuring displacement at a plurality of points in the image.

Gotoh is silent concerning 'the first unique feature is saved as an alignment image for use in locating the second unique feature in the second area.' However, Berman in a substrate position location system teaches using alignment images of structures in an intermediate area in order to determine the absolute position of a target structure in another area (col. 2, lines 20-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to save the first unique feature as an alignment image in order to determine the location of a neighboring feature in another area through shape comparison.

Also as for a 'method of aligning a patterned substrate and measuring the same,' Gotoh does not explicitly state this in the embodiments representative of Fig. 5a and Fig. 5b but he suggests it (col. 2, lines 25-30). And he teaches that there are alignment marks in each scanned area, at least four alignment marks to determine substrate position (Fig. 2: 2; col. 1, lines 40-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was

made to determine substrate position relative to the exposure system for at least two arrays of distortion marks with alignment marks in order to have proper alignment between substrate and mask in order to correctly evaluate the positions of the distortion marks relative to the exposure system by knowing the substrate position.

As for **claim 13**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses exposing the wafer with the exposure system (col. 2, lines 23-24).

As for **claim 14,** Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the substrate is a semiconductor wafer (Fig. 5b: 1).

As for **claim 15**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the first and second unique features include alignment marks on the substrate (col. 2, line 12-15; Fig. 5a: 8; Fig. 5b: 8a).

As for **claim 16**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the alignment data determines an orientation of the substrate relative to the tooling, exposure system (col. 2, lines 25-31).

As for **claim 18**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses a plurality of exposure fields each corresponding a to segment of the wafer (Fig. 5b: 8a); wherein the method comprises at least one of measuring at least one point of interest in each field of a plurality of exposure fields (col. 2, lines 18-30).

As for **claim 19**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the substrate comprising a plurality of exposure fields corresponding to a segment of the wafer, wherein each exposure field comprises at least

one unique feature (Fig. 5b: 8a; wherein, each field comprising a plurality of distortion marks such as 8 from Fig. 5a).

As for **claim 20**, Gotoh in view of Berman and Utsonimya discloses everything as above (see **claim 12**). In addition, Gotoh discloses that each unique feature, distortion mark, is similarly oriented with respect to each corresponding segment, area on the wafer (Fig. 5a: 8; Fig. 5b: 8a with five different segments with each segment having a exposure field).

7. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)—previously cited** in view of **Berman (6,347,291)** further in view of **Wang et al. (4,327,292).**

As for **claim 7**, Gotoh in view of Berman discloses everything as above (see **claim 1**). In addition, Gotoh discloses that the fields are scanned (Fig. 5a: 8; Fig. 5b: 8a; col. 2, lines 24-25). Gotoh is silent concerning raster scanning around the first point of interest until the first unique feature is within a field of view. However, Wang teaches raster scanning for alignment (col. 11, lines 25-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to raster scan the wafer around the area of interest until the first unique feature is within a field of view in order to determine a difference between the scan signal with background and the scan signal of the mark itself by observing changes in the scan signal's intensity over the mark versus proximate the mark thereby differentiating between the mark of interest and the background.

8. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Gotoh et al. (6,225,011)—previously cited** in view of **Berman (6,347,291)** further in view of **Utsunomiya (6,801,825)—previously cited** and further in view of **Wang et al. (4,327,292).**

As for **claim 17**, Gotoh in view of Berman and Utsunomiya discloses everything as above (see **claim 12**). In addition, Gotoh discloses the fields are scanned (Fig. 5a: 8; Fig. 5b: 8a; col. 2, lines 24-25). Gotoh is silent concerning raster scanning around the first point of interest until the first unique feature is within a field of view. However, Wang teaches raster scanning for alignment (col. 11, lines 25-45). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to raster scan the wafer around the area of interest until the first unique feature is within a field of view in order to determine a difference between the scan signal with background and the scan signal of the mark itself by observing changes in the scan signal's intensity over the mark versus proximate the mark thereby differentiating between the mark of interest and the background.

Response to Arguments

9. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection (since the new ground(s) of rejection are now in view of Gotoh's Fig. 2 and there is a rejection under 35 U.S.C. 101). The Examiner apologizes for the inconvenience but upon further consideration a rejection under 35 U.S.C. 101 has been made.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(571) 273-8300**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs
October 27, 2006

HWA (ANDREW) LEE
PRIMARY EXAMINER

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